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# The experimental and numerical analysis of the ballistic resistance of polymer composites

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## Abstract:

This paper concerns the ballistic resistance of hybrid composite shields. The analysis covers three types of two-layer composites. The first shield layer were plates of tungsten carbide (WC), ceramic balls  $Al_2O_3$  (aluminum oxide 92) or steel balls (100Cr6 steel) embedded in a polymer matrix. The second layer was a laminate consisting of 10 layers of aramid fabric in a matrix of styrene-butadiene-styrene (SBS) copolymer. The study presents the analysis of damage caused by a ballistic impact, further compared to the results of computer simulations conducted using the finite element method (FEM). Samples were overshoot along the ballistic track from the Beryl rifle. The 5.56 x 45mm ammunition with the bullet of SS109 MESCO type was used.

**Keywords:** A. Polymer-matrix composites (PMCs); A. Laminates; B. Impact behavior; C. Computational modeling; Ballistic shield

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